



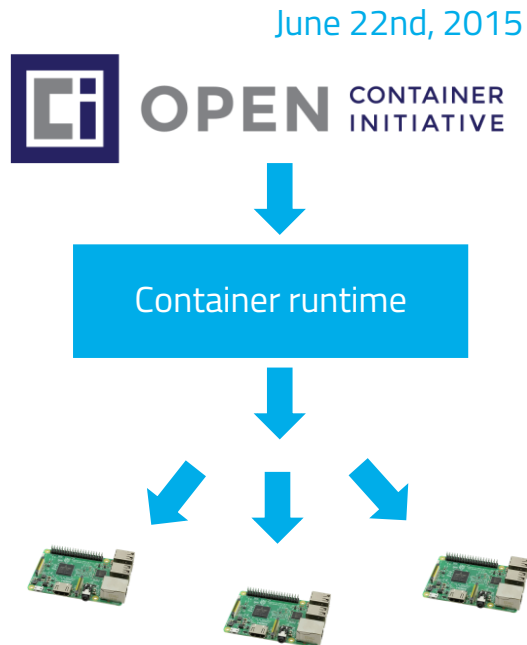
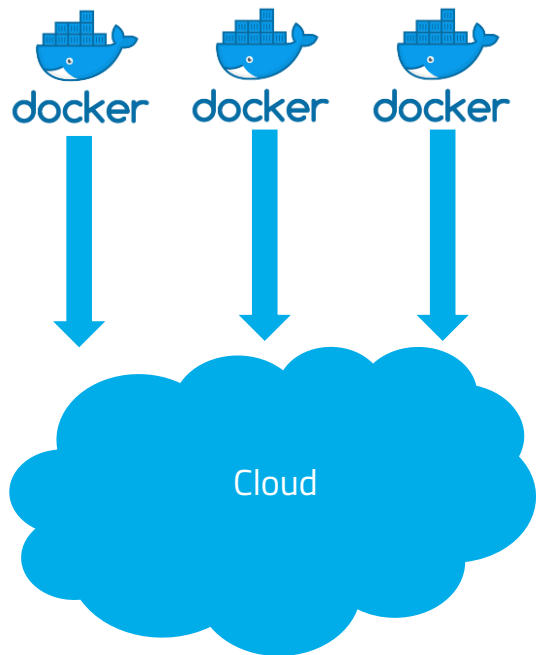
FullMetalUpdate 

**A Fully Integrated
Solution to Update
Your IoT Devices**

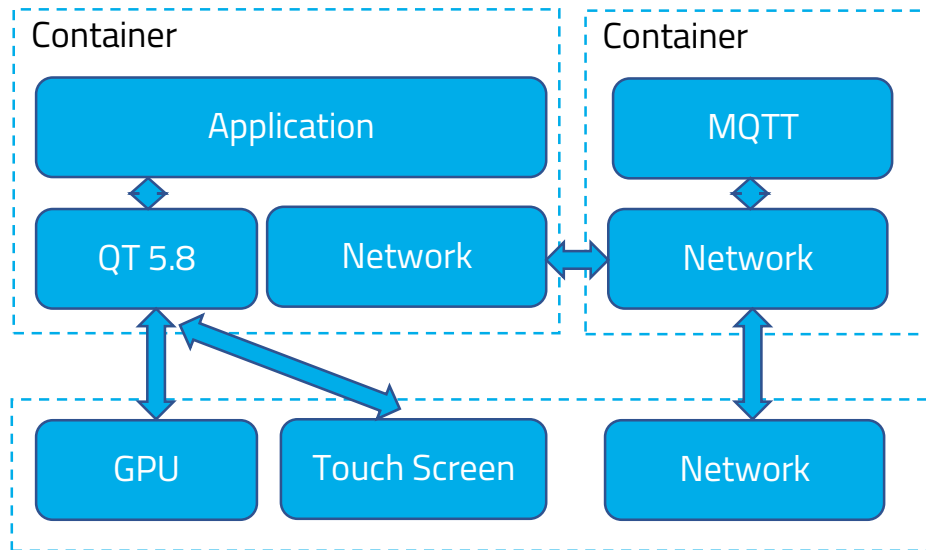
FullMetalUpdate⚡



Why FullMetalUpdate?

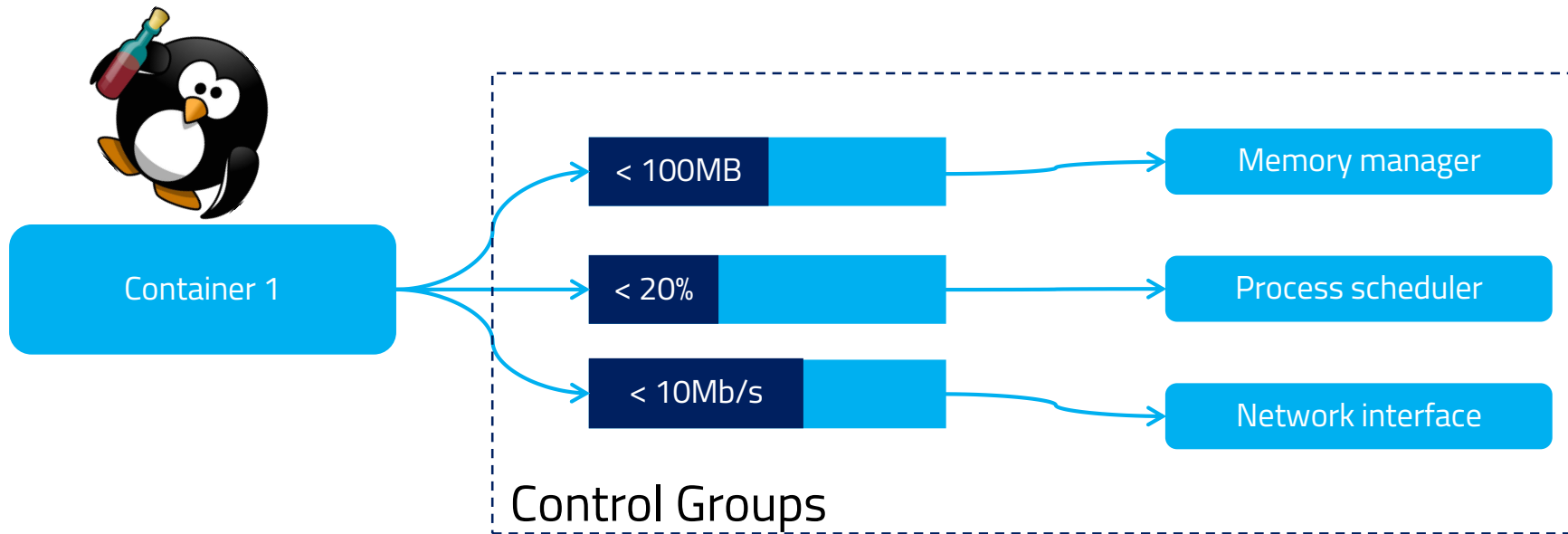


A couple of hours later - Containers



yocto.
PROJECT

A couple of hours later - CGroups



Fine-grained control over allocating, prioritizing, denying and managing system resources

A couple of hours later - Security

- Secomp limit access to system calls
- Rootless containers
- Mandatory Access Control Policy



Early morning

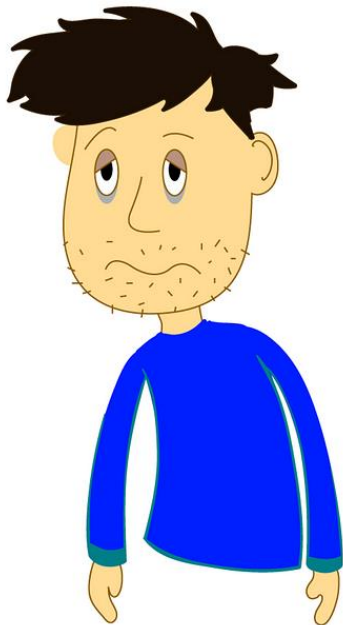


Power Failure: Delta updates are based on Overlayfs, AuFS, ... which are not power failure resistant.

Complexity: Docker comes with multiple layers to manage containers life cycles, updates, ... which are not needed for embedded devices.



Late morning...



Does it exist???



resin.io



balena



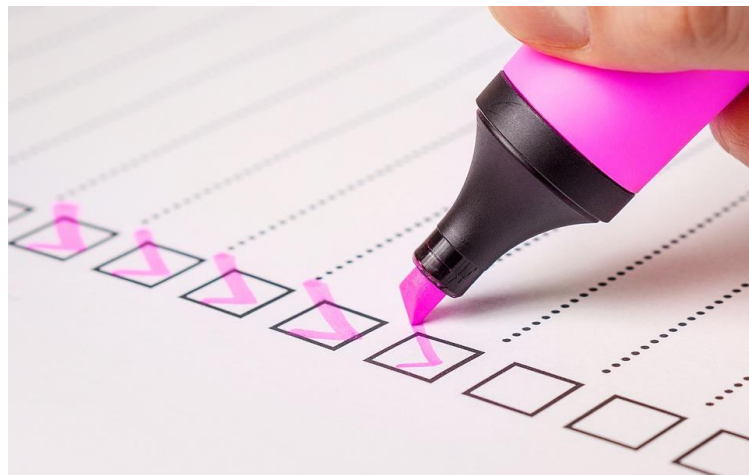
docker

Librsync

Git

What do we need?

1. Runtime to run containers
2. Build system to create containers
3. Delta updates
4. Backend to manage the different updates
5. Client to download update
6. Tool to manage containers life cycle



Step 1 - Open Container Initiative

A Runtime Specification which outlines how to run a “filesystem bundle” that is unpacked on disk.

Multiple implementations:



RunC



Clear Containers

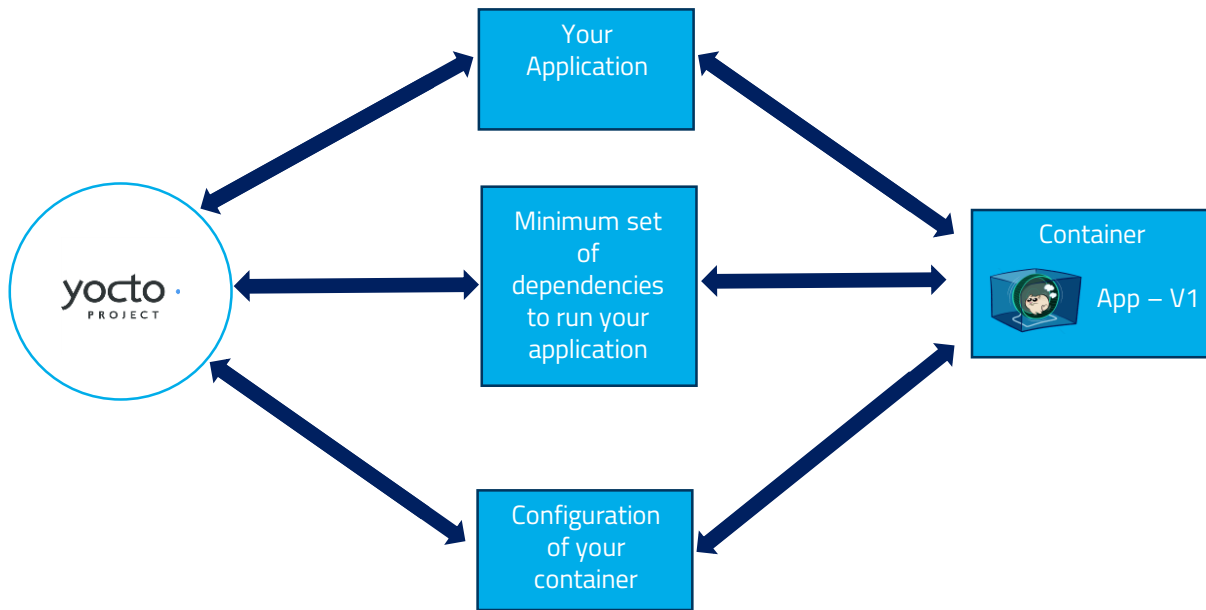


RailCar

ORACLE

Step 2 -Create containers

- Need a replacement for dockerfiles
- Should work for ARM, X86, ... architectures
- A tool to pull only needed dependencies
- Build system itself in a Docker container



Optimize for your processor!

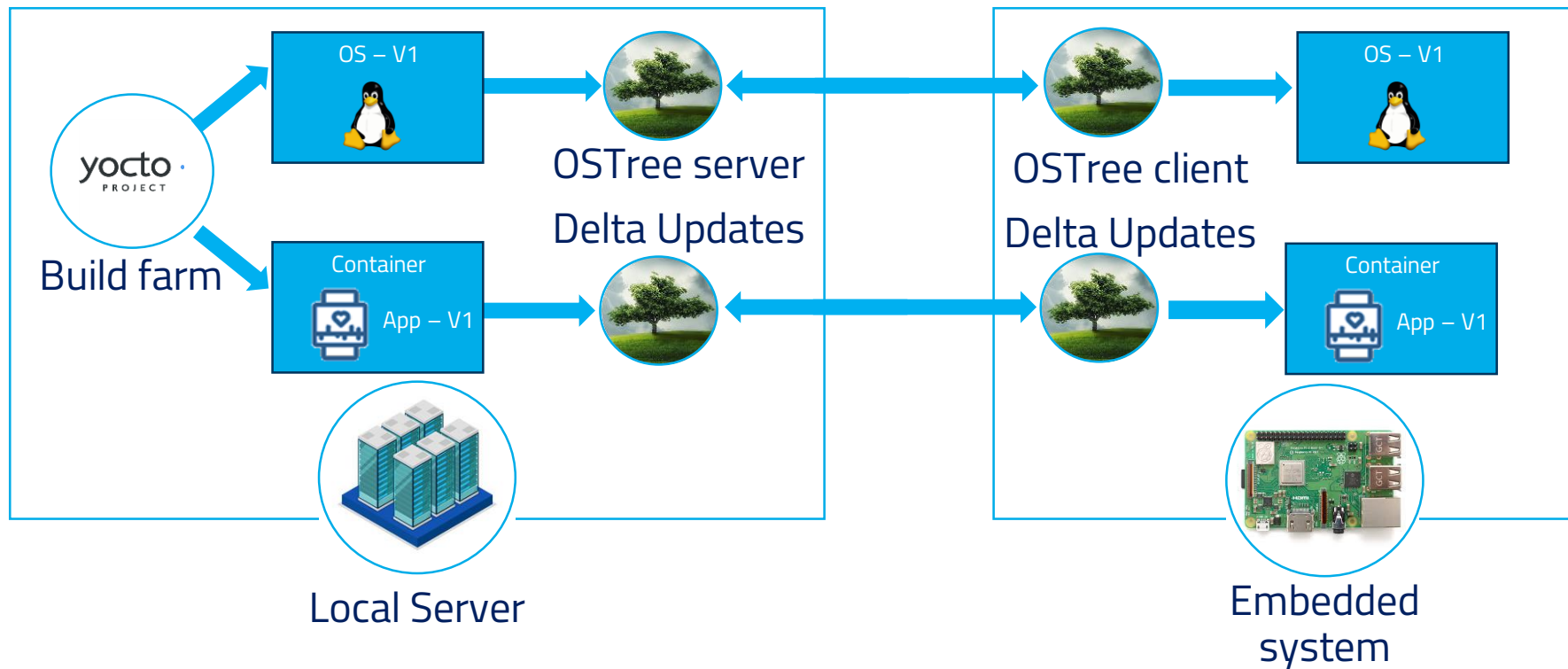
Step 3 – OsTree for delta updates

Used by:



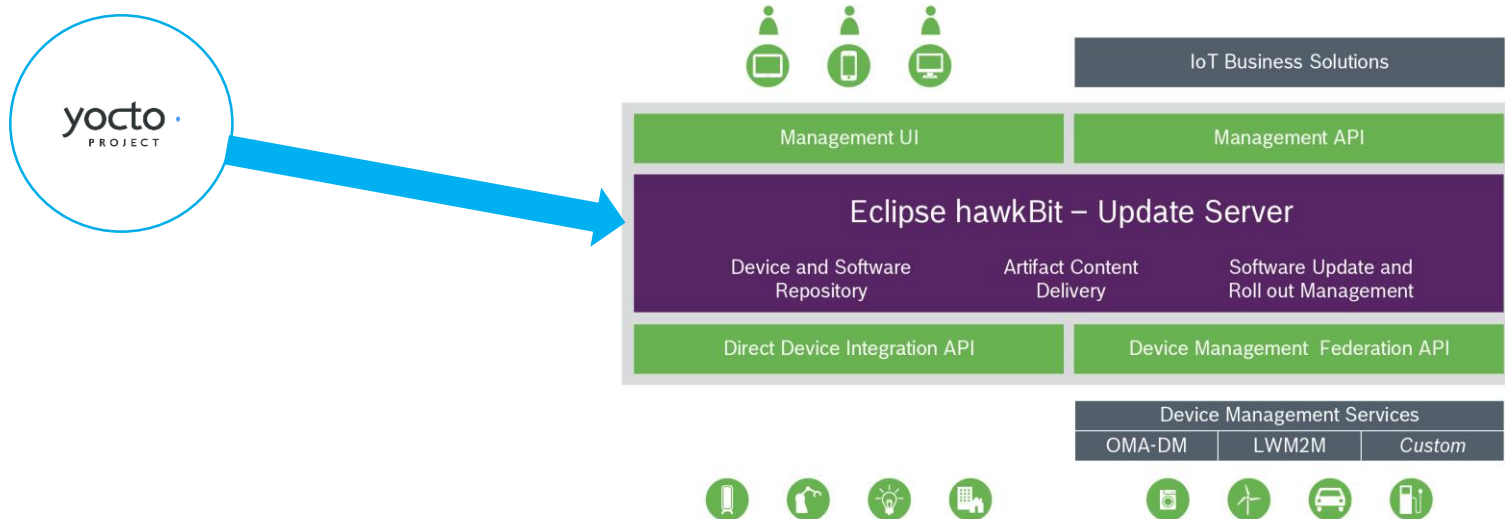
- Git for binaries
- Fully atomic updates
- Only update delta
- Used to update containers and the OS
- Everything happens in the background

Step 3 - Delta updates and containers



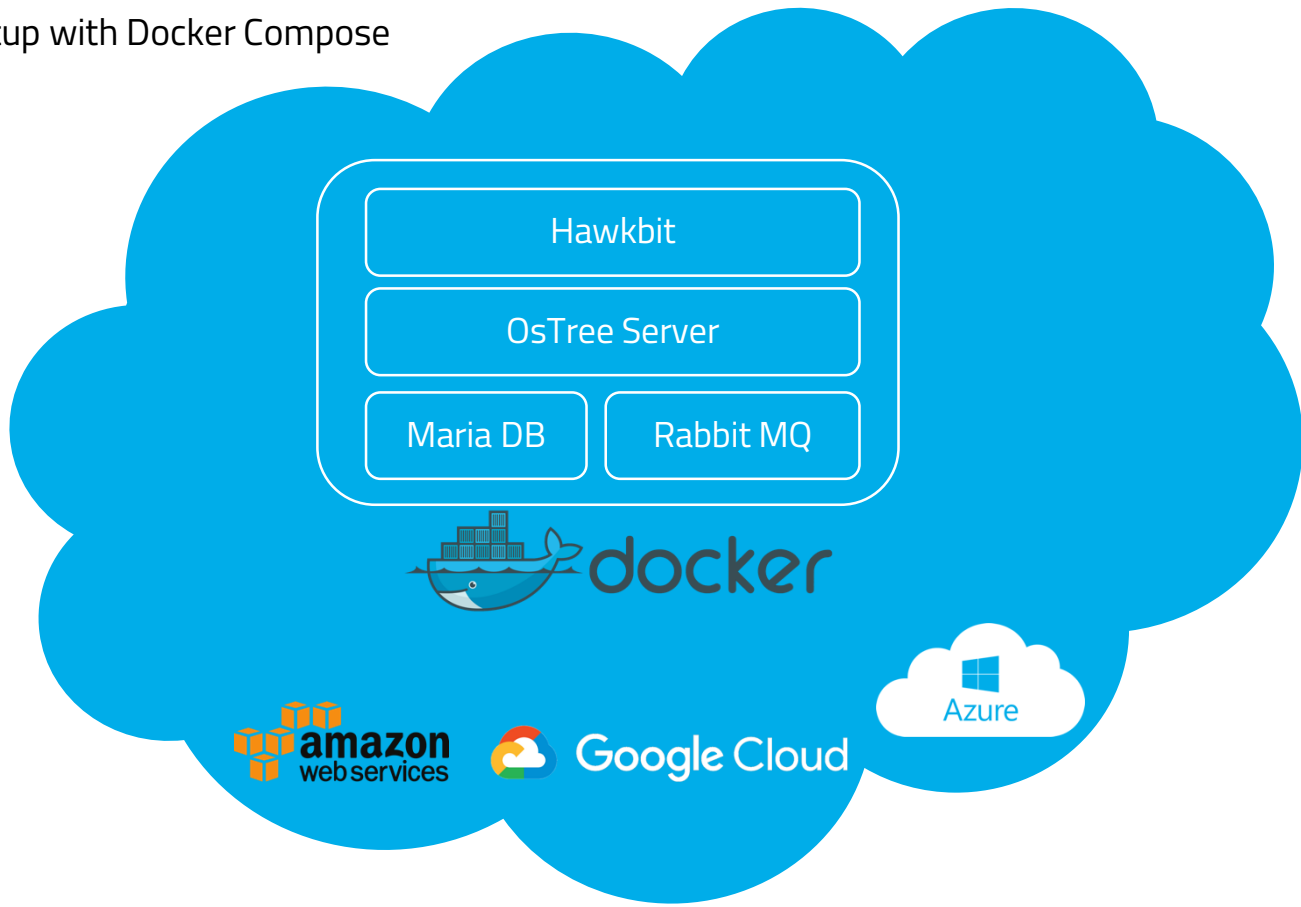
Step 4 - Update server

- Hawkbit as a backend and frontend
- Fully integrated with the Yocto build system



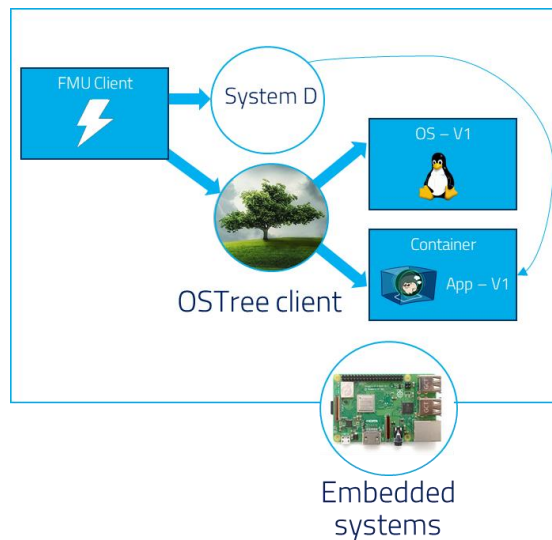
Step 4 - Cloud agnostic

- Easy to setup with Docker Compose

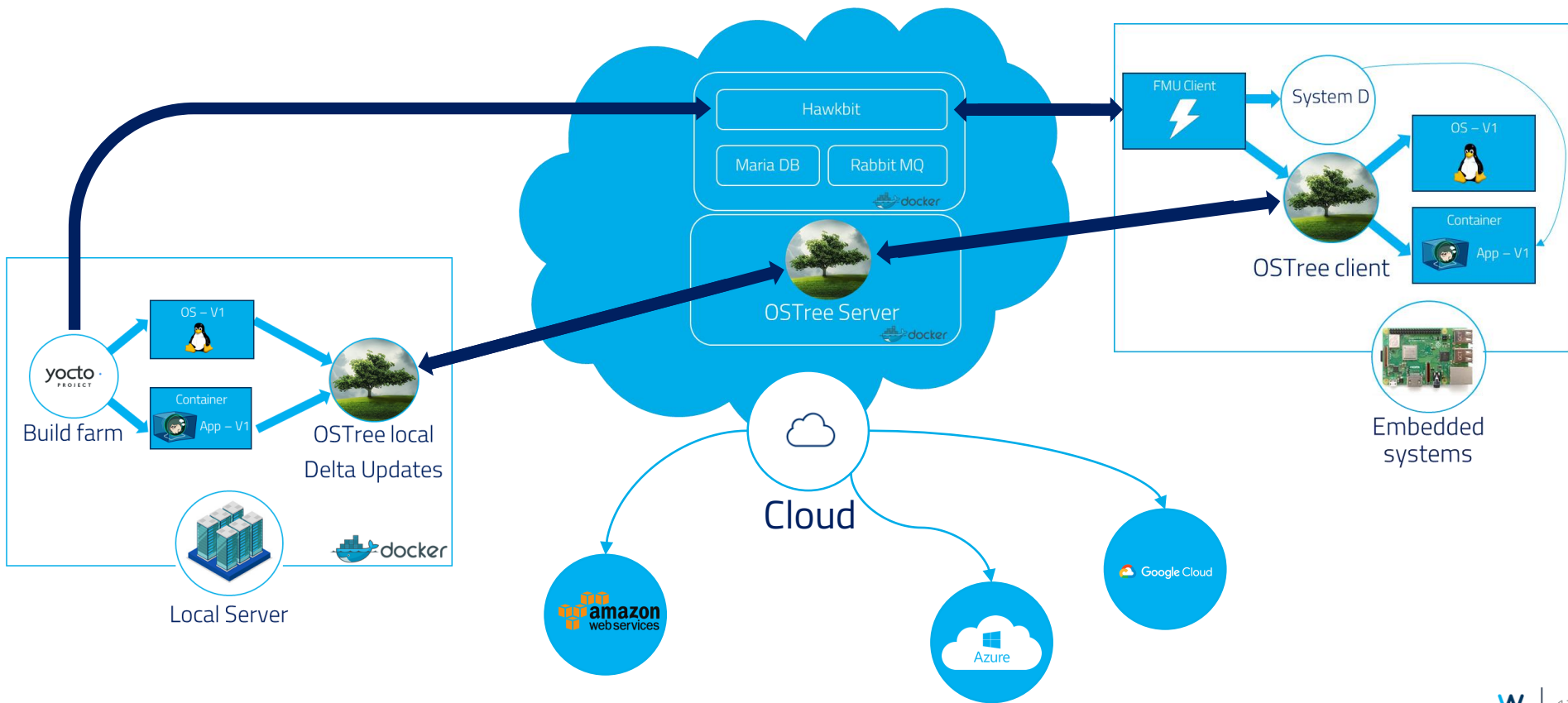


Step 5 & 6 - Client

- Based on Rauc Hawbit client
- Integration with OsTree
- SystemD to manage containers life cycles



Overview



What's available?



fullmetalupdate-cloud-demo

Docker containers started with docker-compose:

- Start an Hawkbit server instance (with MariaDB)
- Start an OsTree instance

fullmetalupdate-yocto-demo

Docker container to automate the build process:

- Select the Machine and the Yocto version to Sync
- Build the OS image: `StartBuild.sh fullmetalupdate-os`
- Build the Containers: `StartBuild.sh build-container container-evcs`
- Start a bash shell: `StartBuild.sh bash`

meta-fullmetalupdate

Includes everything which is not specific to a machine:

- Container framework recipe
- FullMetalUpdate Python client and dependencies
- BB classes to push containers and OS images to OsTree and Hawkbit

meta-fullmetalupdate-extra

Includes everything which is specific to a machine

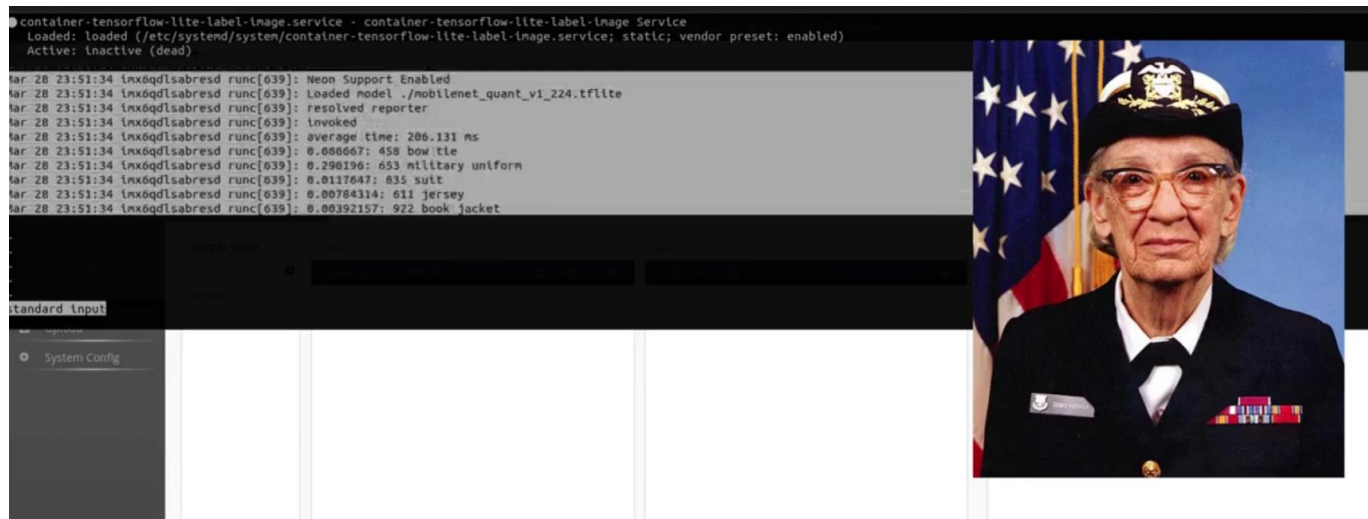
- GPU stuff
- Dynamic layers per machine
- Containers recipes
- Image creation scripts

DEMO



Tensorflow lite in a container

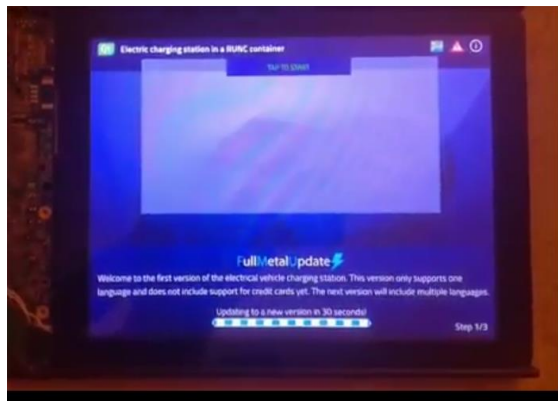
- Add a new container to an IoT device
- Run this container and realize an image classification task
- Measure the performance of the classification model



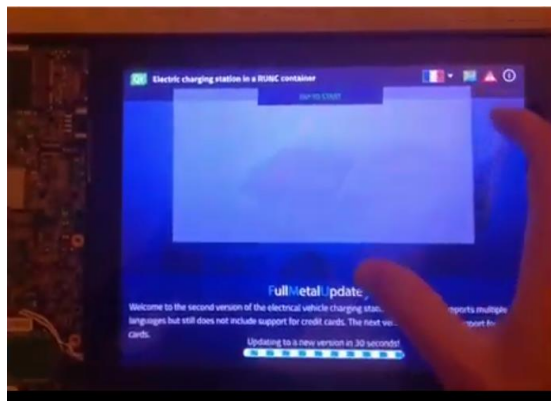
QT in a container

Update your QT application seamlessly

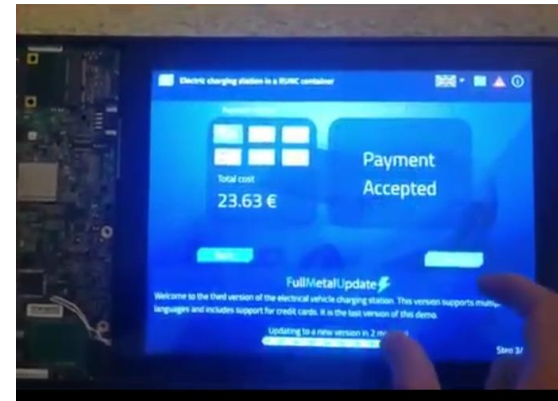
First version



Add multiple languages



Add credit card support



ROADMAP



Roadmap

- Port to STM32MP1
- Port to i.MX8
- Final Integration with Skopeo
- Integration with Container Network Interface
- Port to Warrior and Sumo

CONCLUSION



FullMetalUpdate

- Available on GitHub:

<https://github.com/FullMetalUpdate>

- Documentation:

<https://www.fullmetalupdate.io/docs/documentation/>

- Do you want to contribute?

<https://www.fullmetalupdate.io/docs/contribute/>

Questions



Accountability & Commitment
Cutting Edge expertise
Agility & Scalability Reliability
Local Teams Worldwide presence
Global Actions
Compliance with customers teams

Thank you



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